

Sun StorageTek 5800 System SDK Reference Manual



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Preface

The *Sun StorageTek 5800 System SDK Reference Manual* is written for programmers and application developers. This document, along with the *Sun StorageTek 5800 System Client API Reference Manual*, provides the information that you need in order to develop custom applications for the Sun StorageTek 5800 System.

How This Book Is Organized

- [Chapter 1, “Introduction to the Sun StorageTek 5800 System Client SDK,”](#) provides an introduction to the Sun StorageTek 5800 System client Software Development Kit (SDK) and its components.
- [Chapter 2, “Example Applications,”](#) provides information about the Java and C example applications that are provided with the Sun StorageTek 5800 System SDK.
- [Chapter 3, “Sun StorageTek 5800 System Open Edition Software,”](#) provides information on running test client applications without having to connect to a 5800 system..

Related Books

- *Sun StorageTek 5800 System Regulatory and Safety Compliance Manual*, part number 819-3809
- *Sun StorageTek 5800 System Site Preparation Guide*, part number 820-1635
- *Sun StorageTek 5800 System Administration Guide*, part number 820-4118
- *Sun StorageTek 5800 System Client API Reference Manual*, part number 820-4796
- *Sun StorageTek 5800 System 1.1.1 Release Notes*, part number 820-4120

Related Third-Party Web Site References

Third-party URLs are referenced in this document and provide additional, related information.

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Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- Documentation (<http://www.sun.com/documentation/>)
- Support (<http://www.sun.com/support/>)
- Training (<http://www.sun.com/training/>)

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

TABLE P-1 Typographic Conventions

Typeface	Meaning	Example
AaBbCc123	The names of commands, files, and directories, and onscreen computer output	Edit your .login file. Use ls -a to list all files. machine_name% you have mail.
AaBbCc123	What you type, contrasted with onscreen computer output	machine_name% su Password:
aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is rm filename.

TABLE P-1 Typographic Conventions *(Continued)*

Typeface	Meaning	Example
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	<p>Read Chapter 6 in the <i>User's Guide</i>.</p> <p>A <i>cache</i> is a copy that is stored locally.</p> <p>Do <i>not</i> save the file.</p> <p>Note: Some emphasized items appear bold online.</p>

Shell Prompts in Command Examples

The following table shows the default UNIX® system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	<code>machine_name%</code>
C shell for superuser	<code>machine_name#</code>
Bourne shell and Korn shell	<code>\$</code>
Bourne shell and Korn shell for superuser	<code>#</code>

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Sun StorageTek 5800 System SDK Reference Manual, part number 820-4797

Introduction to the Sun StorageTek 5800 System Client SDK

This chapter provides an introduction to the SunTM StorageTekTM 5800 System client Software Development Kit (SDK) and its components.

The following topics are discussed:

- “[Overview of the SDK](#)” on page 11
- “[SDK Terms of Use](#)” on page 12
- “[SDK Components](#)” on page 12
- “[Supported Operating Systems](#)” on page 12
- “[Software Requirements](#)” on page 13
- “[SDK Installation Instructions](#)” on page 13
- “[5800 System Semantics Overview](#)” on page 14
- “[5800 System Query Language](#)” on page 15
- “[SDK Application Deployment](#)” on page 15

Overview of the SDK

The 5800 system client SDK enables you to work with data and metadata stored on a 5800 system.

This document assumes that you have a basic understanding of how the 5800 system uses data and metadata. For more information, see “[5800 System Semantics Overview](#)” on page 14.

The SDK comes with open edition software that enables you to test client applications without having to connect to a 5800 system. For further documentation on the open edition software, see [Chapter 3, “Sun StorageTek 5800 System Open Edition Software.”](#) Also refer to the *Sun StorageTek 5800 System Administration Guide* to better understand the type of server being emulated.

The SDK provides separate Application Programming Interfaces (APIs) for the JavaTM and C languages. These APIs enable you to store and retrieve data and to store, retrieve, query, and delete metadata records.

For more information on the Java and C APIs, refer to the *Sun StorageTek 5800 SystemClient API Reference Manual*. Also, see [Chapter 2, “Example Applications.”](#) For known bugs, see the *Sun StorageTek 5800 System Release Notes*.

SDK Terms of Use

The 5800 system client SDK is released to you under the following copyright notice:

“Copyright 2007 Sun Microsystems, Inc. All rights reserved. Use is subject to license terms.”

License terms are contained in the file `StorageTek_5800_SLA&Entitlement&PRN.txt` in the top-level directory of the installation. Licence terms for embedded software are in the file `LICENSE.txt` in the same directory.

SDK Components

The 5800 system client SDK distribution includes a Java distribution (Java examples and Java libraries), a C distribution (C examples and libraries), and the 5800 system open edition software. All parts of the SDK support Solaris, Linux, and Windows environments.

The Java and C example programs serve both as examples of how to program a client application and as generally useful utilities in their own right.

The contents of the .zip archive include:

- `SDK_Overview_README.html`
- `doc/`
- `java/`
- `c/`
- `openedition/`
- `StorageTek_5800_SLA&Entitlement&PRN.txt`
- `LICENSE.txt`

Supported Operating Systems

This release supports the following operating systems:

- Red Hat Enterprise Linux 4 (32 bit)
- Red Hat Enterprise Linux 4 (64 bit)
- Solaris 9 SPARC
- Solaris 10 SPARC
- Solaris 10 x64 and x86

- Windows 2003 Server (32 bit)

Software Requirements

This release requires the following software. For detailed software configuration information, refer to the specific section or chapter in this book.

Java API Software Requirements

The 5800 system Java API requires at minimum the JDK™ 5.0 software.

C API Software Requirements

The 5800 system C API requires the following software:

- All platforms
 - GNU make
 - Perl
- Solaris: Sun Studio
- Linux: gcc
- Windows 2003 server:
 - Microsoft Visual C++ Express Edition 2005
 - Microsoft Windows SDK
 - Cygwin (See <http://www.cygwin.com>)

Open Edition Software Requirements

The 5800 system open edition software requires at minimum the JDK™ 5.0 software.

SDK Installation Instructions

The 5800 system SDK is compressed in a file with a name similar to `StorageTek5800_SDK_1_1-20.zip`, where `1_1-20` refers to the version (`1_1`) and build number (`20`). This `.zip` file expands into a directory `StorageTek5800_SDK_1_1-20`, which contains the entire SDK.

5800 System Semantics Overview

This section provides an overview of 5800 system semantics.

Data and Metadata

The 5800 system stores two types of data: *arbitrary object data* and *structured metadata records*. Every metadata record is associated with exactly one data object. Every data object has at least one metadata record. A unique object identifier (OID) is returned when a metadata record is stored. The OID can later be used to retrieve the metadata record or its object data. In addition, metadata records can be retrieved by a query:

`OID ↔ Metadata Record → Object Data`

The two types of metadata are *system metadata* and *user metadata*. The names and types of system metadata are predefined and cannot be overridden by the user.

Metadata Schema

A user metadata record consists of a set of attributes. The set of possible attributes is defined by the schema. Only one schema exists for each 5800 system. For information on configuring a schema, see “Configuring Metadata and File System Views” in *Sun StorageTek 5800 System Administration Guide*.

The 5800 system open edition software loads its schema from an XML file. The `metadata_merge_config` utility can be used to extend the default schema, appending the new entries to the original schema, which is then read by the open edition software. For additional information, see [Chapter 2, “Example Applications,”](#) and [Chapter 3, “Sun StorageTek 5800 System Open Edition Software.”](#)

Attributes

For information on the valid data types that you can use when specifying attributes in a schema, see “Configuring Metadata and File System Views” in *Sun StorageTek 5800 System Administration Guide*.

Namespace

A namespace is a container that holds a set of typed attribute names. Attribute names must be unique within a given namespace. Defining a namespace is a way to organize and group together a set of related attribute names for a given application. For more information, see “Configuring Metadata and File System Views” in *Sun StorageTek 5800 System Administration Guide*

5800 System Query Language

The 5800 system Java and C APIs both have a Query method that passes a query string to the 5800 system. Queries are presented to the name-value metadata cache.

For more information on the 5800 system query language, see Chapter 4, “Sun StorageTek 5800 System Query Language,” in *Sun StorageTek 5800 SystemClient API Reference Manual*.

SDK Application Deployment

Java API

You must deploy `honeycomb-client.jar` with any application using the Java API. If you are using the SDK example applications, you must also deploy `honeycomb-sdk.jar`.

C API

The files in the `lib` directory must be deployed with any application using the C API. Different `lib` directories exist for different operating systems. You must use the correct `lib` directory for the OS under which the application is deployed. The `LD_LIBRARY_PATH` environment variable must be set accordingly for Unix systems. In the Windows environment, you must update the `PATH` environment variable.

Example Applications

This chapter provides information about the Java and C example applications that are provided with the 5800 system SDK.

The following topics are discussed:

- “[Example Application Summary](#)” on page 17
- “[Java Example Applications](#)” on page 18
- “[C Example Applications](#)” on page 33

Example Application Summary

Table 2–1 summarizes the Java and C example applications provided with the 5800 system SDK. All code examples are command-line applications.

For detailed information about the Java example applications, see “[Java Example Applications](#)” on page 18.

For detailed information about the C example applications, see “[C Example Applications](#)” on page 33.

TABLE 2–1 5800 system Client SDK Example Applications

Application	Java Version	C Version
StoreFile – Enables you to specify a file from the command line to store on a 5800 system server as data. You can also specify metadata to include with the file.	“ StoreFile ” on page 21	“ StoreFile ” on page 35

TABLE 2-1 5800 system Client SDK Example Applications *(Continued)*

Application	Java Version	CVersion
CheckIndexed – Checks if the metadata for an object is present in the query engine, and inserts it if not.	“CheckIndexed” on page 23	“CheckIndexed” on page 36
RetrieveData – Enables you to retrieve data from the 5800 system server by Object ID. The data object is sent to standard output or to a file specified on the command line.	“RetrieveData” on page 24	“RetrieveData” on page 37
RetrieveMetadata – Enables you to retrieve a metadata record from the 5800 system server associated with the supplied OID. The metadata record is printed to standard output.	“RetrieveMetadata” on page 25	“RetrieveMetadata” on page 38
AddMetadata – Enables you to specify name-value pairs from the command line to store on a 5800 system server as a metadata record.	“AddMetadata” on page 26	“AddMetadata” on page 39
DeleteRecord – Deletes a record from the 5800 system server for an OID supplied on the command line.	“DeleteRecord” on page 28	“DeleteRecord” on page 41
Query – Queries a 5800 system server for specified metadata. The query string is provided on the command line. Query can print out the results as a list of name-value pairs or as a list of OIDs. You can specify the maximum number of results returned.	“Query” on page 29	“Query” on page 42
RetrieveSchema – Retrieves the schema from a 5800 system server, printing it to standard output.	“RetrieveSchema” on page 31	“RetrieveSchema” on page 44
GetDate – Gets the date.	“GetDate” on page 32	N/A

Java Example Applications

This section provides detailed information about the Java example applications provided with the 5800 system client SDK.

Example Overview

Included with the 5800 system SDK are several command-line example applications that demonstrate the Java API. The example applications are located in the SDK in the `java/examples` directory. These example applications come complete with a build script.

Before You Begin

Make sure you configure your software environment before using the Java example applications.

- In Microsoft Windows 2003:

Add `C:\Program Files\Java\jdk_version\bin` to the PATH environment variable where `jdk_version` is the version, for example, `jdk5.0`.

To edit the windows PATH environment variable:

1. Click the Start button.
2. Right-click My Computer and select properties to launch System Properties.
3. Click the Advanced tab.
4. Click Environment Variables.
5. Under System Variables, scroll down and click Path.
6. Click Edit to launch Edit System Variable.
7. Add the Java path name to the PATH environment variable. Make certain each path name is separated by a semicolon (`;`).
8. Click OK to close each window.

Also see “[Software Requirements](#)” on page 13.

Running the Applications

UNIX (`.sh`) and Windows (`.bat`) scripts for running the example applications are provided in the `java/scripts/` directory. These scripts must be run from the `java/scripts/` directory. The scripts illustrate the CLASSPATH environment variable required. The `.jar` files are in the `java/lib/` directory.

Note – The usage messages printed by the applications omit the CLASSPATH environment variable for the sake of readability. If you are running the example application without using the provided scripts, then you must set the CLASSPATH environment variable manually.

Building the Java Example Applications

To build the Java example applications, go to the `java/examples/` directory and execute the `master-build.sh` script for Solaris and Linux environments or the `master-build.bat` script for Windows environments. These scripts build the examples and put them in the `honeycomb-sdk.jar` archive located in the `java/lib` directory.

Running a Java Example Application

Once you have built the Java example applications, go to the `java/scripts` directory and execute the `.sh` scripts for Solaris and Linux environments or `.bat` scripts for Windows environments:

Syntax: `script_name arguments`

See the scripts for details of how the applications are run.

About the Example Application Source Code

The Java example applications are all simple applications that follow the same basic structure. First, `CommandLine.parse` is called to parse the argument list. Next, the appropriate method in the `NameValueObjectArchive` class is called to communicate with the 5800 system server. Finally, output is delivered back to either standard output, a file, or both. Refer to the comments in the sample code for further details.

Example Applications

The following sections describe the Java example applications that are included with the 5800 system client SDK:

- “[StoreFile](#)” on page 21
- “[CheckIndexed](#)” on page 23
- “[RetrieveData](#)” on page 24
- “[RetrieveMetadata](#)” on page 25
- “[AddMetadata](#)” on page 26
- “[DeleteRecord](#)” on page 28
- “[Query](#)” on page 29
- “[RetrieveSchema](#)” on page 31
- “[GetDate](#)” on page 32

StoreFile

Stores a file and associated metadata to a 5800 system server.

Synopsis

```
java StoreFile <IP | HOST> <FILE> [OPTIONS]
```

Description

Stores a file and its associated metadata record. If no -m options are specified, a metadata record without user content is generated. The OID of the metadata record is printed to stdout.

Note – StoreFile interprets the time in metadata arguments as local time zone unless the T..Z format indicating UTC is used. For example, 1952-10-27T00:30:29.999Z.

Options

```
-m <name>=<value>
```

Any number of -m options can be specified. Each -m option specifies a single (name, value) pair.

<name> should be specified in the format <namespace>. <attribute>. Use double quotes if <value> is a string containing spaces.

```
-h
```

Print this message.

Examples

```
java StoreFile 10.152.0.12 myFile  
    java StoreFile server myFile.jpg \  
        -m filesystem.mimetype="image/jpeg"  
    java StoreFile server myFile \  
        -m system.test.type_char="do re mi"  
    java StoreFile server myFile \  
        -m system.test.type_string="fa so la"  
    java StoreFile server myFile \  
        -m system.test.type_long=123  
    java StoreFile server myFile \  
        -m system.test.type_double=1.23  
    java StoreFile server myFile \  
        -m system.test.type_binary=0789abcdef  
    java StoreFile server myFile \  
        -m system.test.type_date=2010-10-20
```

```
java StoreFile server myFile \
    -m system.test.type_time=23:30:29
java StoreFile server myFile \
    -m system.test.type_timestamp="2010-10-20 23:30:29.999"
java StoreFile server myFile \
    -m name1=value1 -m name2="value 2"
```

Source Code

[java/examples/StoreFile.java](#)

CheckIndexed

Ensure an object can be queried. Checks if the metadata for an object is present in the query engine, and inserts the metadata if it is not present.

Synopsis

```
java CheckIndexed <IP | HOST> <OID> [OPTIONS]
```

Description

Check with the 5800 systemserver to determine if the specified OID has become queryable. If not, attempt to make it queryable.

A short message about the supplied OID is printed to stdout:

```
Object OID was already queryable.  
Object OID not yet queryable.  
Object OID has now been made queryable.
```

Options

```
-h
```

Print this message.

Examples

```
java CheckIndexed server \  
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000  
java CheckIndexed 10.152.0.12 \  
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
```

Source Code

```
java/examples/CheckIndex.java
```

RetrieveData

Retrieves data from a 5800 system server.

Synopsis

```
java RetrieveData <IP | HOST> <OID> [FILE] [OPTIONS]
```

Description

Retrieves data from the 5800 system. The OID specifies what data to retrieve. Data is written to FILE, if specified, otherwise to stdout.

Options

-h

Print this message.

Examples

```
java RetrieveData archivehost \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
    /archive/log.1
java RetrieveData 10.152.0.12 \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
    /archive/log.2
```

Source Code

[java/examples/RetrieveData.java](#)

RetrieveMetadata

Retrieves metadata from the 5800 system. The OID specifies what data to retrieve.

Note – By default, RetrieveMetadata displays the time according to the configuration of the client machine, including its time zone.

Synopsis

```
java RetrieveMetadata <IP | HOST> <OID> [OPTIONS]
```

Description

Retrieves a data record and metadata from the 5800 system server. The metadata record identified by the supplied OID is printed to stdout.

Options

-h

Print this message.

Examples

```
java RetrieveMetadata 10.152.0.12 \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
```

Source Code

[java/examples/RetrieveMetadata.java](#)

AddMetadata

Adds a metadata record to an already stored object.

Synopsis

```
java AddMetadata <IP | HOST> <OID> [OPTIONS]
```

Description

Adds a new metadata record to an existing data object.

Options

```
-m <name>=<value>
```

Any number of -m options can be specified. Each option specifies a single (name, value) pair.

<name> should be specified in the format <namespace>. <attribute>. Use double quotes if <value> is a string containing spaces.

```
-h
```

Print this message.

Examples

```
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m filesystem.mimetype="image/jpeg"
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_char="do re mi"
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_string="fa so la"
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_long=123
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_double=1.23
java AddMetadata
    server 0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_date=1952-10-27
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_time=23:30:29
```

```
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m system.test.type_timestamp="1952-10-27 23:30:29.999"
java AddMetadata server \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000@ \
    -m name1=value1 -m name2="value 2"
```

Source Code

`java/examples/AddMetadata.java`

DeleteRecord

Deletes the Sun 5800 system metadata record associated with an OID.

Synopsis

```
java DeleteRecord <IP | Host> <OID> [OPTIONS]
```

Description

Deletes the record with the specified OID. If this record is the only record pointing to the data, the data will also be deleted.

Options

-v

Print deleted OID to stdout.

-h

Print this message.

Examples

```
java DeleteRecord server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
```

Source Code

[java/examples/DeleteRecord.java](#)

Query

Queries a 5800 system server for metadata records that match the query string passed on the command line.

Note – Query requires the T..Z UTC format. For example, 1952-10-27T00:30:29.999Z.

Synopsis

```
java Query <IP | HOST> <QUERY> [OPTIONS]
```

Description

Queries for metadata records. QUERY is of the form:

```
<name1>='<value1>' AND <name2>='<value2>' OR ...
```

See the examples below for formatting of various types of values. The OID and any specified fields of metadata records that match the query are printed to stdout.

<name> should be specified in the format <namespace>.<attribute>.

Note that names that are keywords need to be enclosed in escaped double quotes (for example, with the bash shell, use "\"<name>\\"='<value>\""). Refer to the list of keywords in Chapter 4, "Sun StorageTek 5800 System Query Language," in *Sun StorageTek 5800 SystemClient API Reference Manual*.

Options

```
-s <FIELD>
```

Specifies a field to be retrieved, much like an SQL select clause. To retrieve multiple fields, repeat this option. By default, the results are returned as a list of OIDs.

```
-n <number of results>
```

The maximum number of metadata records or OIDs that will be returned. The default is 1000.

```
-h
```

Print this message.

Examples

In the following examples, "first" is a keyword.

```
java Query server "book.author='King"
java Query server "\"first\"='a"
java Query 10.152.0.12 "mp3.artist='The Beatles' AND mp3.album='Abbey Road'"
java Query 10.152.0.12 "mp3.artist='The Beatles'" -s mp3.album -s mp3.title
java Query 10.152.0.12 system.test.type_char="do re mi"
java Query 10.152.0.12 system.test.type_string)="fa so la"
java Query 10.152.0.12 system.test.type_long=123
java Query 10.152.0.12 system.test.type_double=1.23
java Query 10.152.0.12 system.test.type_binary="x'0789abcdef"
java Query 10.152.0.12 system.test.type_date="2010-10-20"
java Query 10.152.0.12 system.test.type_time="23:30:29"
java Query 10.152.0.12 system.test.type_timestamp="{timestamp'2010-10-20T23:30:29.123Z}'"
```

Source Code

[java/examples/Query.java](#)

RetrieveSchema

Returns the schema defined on a 5800 system server to standard output.

Synopsis

```
java RetrieveSchema [OPTIONS] <IP | HOST>
```

Description

Retrieves the metadata schema from a 5800 system server, printing it to stdout.

Options

-h

Print this message.

Examples

```
java RetrieveSchema archivehost
```

Source Code

```
java/examples/RetrieveSchema.java
```

GetDate

Gets the date.

Synopsis

```
java GetDate <IP | HOST> [OPTIONS]
```

Description

Gets the current date used to compute time setting and checking during store and delete operations.

Options

-h

Print this message.

Examples

```
java GetDate server
```

Source Code

```
java/examples/GetDate.java
```

C Example Applications

This section provides detailed information on the C example applications provided with the 5800 system client SDK.

Example Overview

Included with the 5800 system SDK are several command-line example applications that demonstrate the use of the C API. The example applications are located in the SDK under `c/examples`. Appropriate libraries are supplied for Solaris SPARC, Solaris x86, Red Hat Linux, and Windows.

Before You Begin

Make sure you configure your software environment before using the C example applications.

- In Solaris and Linux, set the `LD_LIBRARY_PATH` environment variable to *SDK directory name/c/OS/lib* where *SDK directory name* is the root directory of the unzipped 5800 system SDK archive and OS is either Solaris or Linux. For example:

`StorageTek500_SDK_1_1-20/c/Solaris/lib`

- In Microsoft Windows 2003:

The example programs will run if they are run as installed in the default build directory. However, if you have moved them elsewhere, the location of the library files (DLLs) must be added to the PATH environment variable as follows:

`C:\StorageTek500_SDK_1_1_82\c\Win32\lib`

To edit the windows PATH environment variable:

1. Click the Start button.
2. Right-click My Computer and select properties to launch System Properties.
3. Click the Advanced tab.
4. Click Environment Variables.
5. Under System Variables, scroll down and click Path.
6. Click Edit to launch Edit System Variable.
7. Add the full path name of the SDK lib directory to the PATH environment variable. Make certain each path name is separated by a semicolon (;).
8. Click OK to close each window.

Also see “[Software Requirements](#)” on page 13.

Building the C Example Applications

To build the C example applications, go to the c/examples directory and run make. This will build the example applications and put them in the c/examples/OS/build directory.

Each C example application can be built separately by running `make program_name`.

Running a C Example Application

Once you have built the C example applications, go to the c/examples/<OS>/build directory and execute the binary file with the appropriate command line. The examples depend on libhoneycomb.so.

About the C Example Application Source Code

First, the function `parseCommandLine` is called to parse the command line and store the information in a struct called `Commandline`. Next, any files that contain data to be sent to the 5800 system server are opened. The appropriate 5800 system C API is then called. Finally, output is delivered back to either standard output, a file, or both. Refer to the comments in the sample code for further details.

Example Applications

The following C example applications are included with the 5800 system client SDK:

- “[StoreFile](#)” on page 35
- “[CheckIndexed](#)” on page 36
- “[RetrieveData](#)” on page 37
- “[RetrieveMetadata](#)” on page 38
- “[AddMetadata](#)” on page 39
- “[DeleteRecord](#)” on page 41
- “[Query](#)” on page 42
- “[RetrieveSchema](#)” on page 44

StoreFile

Stores a file and associated metadata on a 5800 system server.

Synopsis

```
StoreFile <IP | HOST> <FILE> [OPTIONS]
```

Description

Stores a file and its associated metadata record. If no -m options are specified, a metadata record without user content is generated. The OID of the metadata record is printed to stdout.

Options

-m <name>=<value>

Any number of -m options can be specified. Each option specifies a single (name, value) pair.

<name> should be specified in the format <namespace>. <attribute>. Use double quotes if <value> is a string containing spaces.

-h

Print this message.

Examples

```
StoreFile server /var/log/messages
StoreFile server ~/journal
StoreFile server myfile.jpg -m filesystem.mimetype="image/jpeg"
StoreFile 10.152.0.12 myfile -m system.test.type_char="do re mi"
StoreFile 10.152.0.12 myfile -m system.test.type_string="fa so la"
StoreFile 10.152.0.12 myfile -m system.test.type_long=123
StoreFile 10.152.0.12 myfile -m system.test.type_double=1.23
StoreFile 10.152.0.12 myfile -m system.test.type_binary=0789abcdef
StoreFile 10.152.0.12 myfile -m system.test.type_date=2010-10-20
StoreFile 10.152.0.12 myfile -m system.test.type_time=23:30:29
StoreFile 10.152.0.12 myfile \
    -m system.test.type_timestamp="2010-10-20T23:30:29.999"
StoreFile 10.152.0.12 myfile -m name1=value1 -m name2="value 2"
```

Source Code

[c/examples/StoreFile.c](#)

CheckIndexed

Ensure an object is queryable. Checks if the metadata for an object is present in the query engine, and inserts the metadata if it is not present.

Synopsis

```
CheckIndexed <IP | HOST> <OID> [OPTIONS]
```

Description

Check with the 5800 systemserver to determine if the specified OID has become queryable. If not, attempt to make it queryable.

A short message about the supplied OID is printed to stdout:

```
Object OID was already queryable.  
Object OID not yet queryable.  
Object OID has now been made queryable.
```

Options

```
-h
```

Print this message.

Examples

```
CheckIndexed archivehost \  
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000  
CheckIndexed 10.152.0.12 \  
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
```

Source Code

```
c/examples/CheckIndexed.c
```

RetrieveData

Retrieves a data object from a 5800 system server.

Synopsis

```
RetrieveData <IP | HOST> <OID> <FILE> [OPTIONS]
```

Description

Retrieves data from the 5800 system. The OID specifies what data to retrieve. Data is written to FILE, if specified, otherwise to stdout.

Options

```
-h
```

Print this message.

Examples

```
RetrieveData storagetek \
    0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
    /archive/log.1
```

Source Code

```
c/examples/RetrieveData.c
```

RetrieveMetadata

Retrieves a metadata record from a specified 5800 system server.

Synopsis

```
RetrieveMetadata <IP | HOST> <OID> [OPTIONS]
```

Description

Retrieves metadata from the 5800 system. The OID specifies what data to retrieve. Metadata is printed to stdout.

Options

```
-h
```

Print this message.

Examples

```
RetrieveMetadata archivehost \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
RetrieveMetadata 10.152.0.12 \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
```

Source Code

```
c/examples/RetrieveMetadata.c
```

AddMetadata

Adds a metadata record to an already stored object.

Synopsis

```
AddMetadata <IP | HOST> <OID> [OPTIONS]
```

Description

Adds a new metadata record to an existing data object.

Options

```
-m <name>=<value>
```

Any number of -m options can be specified. Each option specifies a single (name, value) pair.

<name> should be specified in the format <namespace>. <attribute>. Use double quotes if <value> is a string containing spaces.

```
-h
```

Print this message.

Examples

```
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m filesystem.mimetype="image/jpeg"
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_char="do re mi"
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_string="fa so la"
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_long=123
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_double=1.23
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_date=1992-10-27
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_time=23:30:29
```

```
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m system.test.type_timestamp="1992-10-27T23:30:29"
AddMetadata server \
0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000 \
-m name1=value1 -m name2="value 2"
```

Source Code

c/examples/AddMetadata.c

DeleteRecord

Deletes a record associated with an OID.

Synopsis

```
DeleteRecord <IP | HOST> <OID> [OPTIONS]
```

Description

Deletes a record associated with an OID. The OID specifies which record to delete. The record consists of all metadata associated with the OID, or the data if it is a data OID. The OID itself becomes inaccessible. If this OID is the last OID associated with the data, the data is also deleted.

Options

-v

Print deleted OID to stdout.

-h

Print this message.

Examples

```
DeleteRecord server 0200004f75ee01094cc13e11dbbad000e08159832d000024d40200000000
```

Source Code

c/examples/DeleteRecord.c

Query

Queries a 5800 system server for metadata records that match the query string passed on the command line.

Note – Query requires the T..Z UTC format. For example, 1952-10-27T00:30:29.999Z.

Synopsis

```
Query <IP | HOST> <QUERY> [OPTIONS]
```

Description

Queries for metadata records. QUERY is of the form:

```
<name1>='<value1>' AND <name2>='<value2>' OR ...
```

See the examples below for formatting of various types of values. The OID and any specified fields of metadata records that match the query are printed to `stdout`.

`<name>` should be specified in the format `<namespace>.<attribute>`.

Note that names that are keywords need to be enclosed in escaped double quotes (for example, with the bash shell, use "`\ "<name>\ '='<value>"`"). Refer to the list of keywords in Chapter 4, "Sun StorageTek 5800 System Query Language," in *Sun StorageTek 5800 SystemClient API Reference Manual*.

Options

```
-s <FIELD>
```

Print out results as metadata name-value records. Use as many `-s` switches as needed to define all fields that will be printed to `stdout`.

```
-n <number of results>
```

The maximum number of metadata records or OIDs that will be returned. The default is 1000.

```
-h
```

Print this message.

Examples

In the following examples, "first" is a keyword.

```
Query archivehost "book.author='King'"  
Query archivehost "\"first\"='a"  
Query archivehost system.test.type_char="do re mi"  
Query archivehost system.test.type_string="fa so la"  
Query archivehost system.test.type_long=123  
Query archivehost system.test.type_double=1.23  
Query archivehost system.test.type_binary="x'0789abcdef'"  
Query archivehost system.test.type_date="2010-10-20"  
Query archivehost system.test.type_time="22:10:29"  
Query archivehost system.test.type_timestamp="{timestamp'2010-10-20T23:30:29.123Z'}"  
Query 10.152.0.12 "mp3.artist='The Beatles' AND mp3.album='Abbey Road'"  
Query 10.152.0.12 "mp3.artist='The Beatles'" -s mp3.album -s mp3.title  
Query 10.152.0.12 "system.test.type_timestamp={timestamp '1952-10-27T08:30:29.999Z'}"
```

Source Code

c/examples/Query.c

RetrieveSchema

Prints metadata attributes to `stdout`.

Synopsis

```
RetrieveSchema <IP | HOST> [OPTIONS]
```

Description

Retrieves the schema from a 5800 system server, printing it to `stdout`.

Options

`-h`

Print this message.

Examples

```
RetrieveSchema archivehost
```

Source Code

```
c/examples/RetrieveSchema.c
```

Sun StorageTek 5800 System Open Edition Software

This chapter provides information on running the 5800 system open edition software.

Note – For the 1.1.1 release, the name of the 5800 system emulator was changed to the 5800 system open edition software.

The following topics are discussed:

- “[Introduction to the Open Edition Software](#)” on page 45
- “[Software Requirements](#)” on page 46
- “[Open Edition Software Startup](#)” on page 46
- “[Open Edition Software Shutdown](#)” on page 46
- “[Schema Modification](#)” on page 46
- “[Open Edition Software Event Log](#)” on page 47
- “[Open Edition Software Configuration Settings](#)” on page 47

Introduction to the Open Edition Software

The 5800 system open edition software mimics the behavior of a 5800 system server. This feature enables you to test software being developed for a 5800 system without having to access a 5800 system server. The open edition software stores all data and metadata on the local hard drive. This data is by default stored in the `openedition/var` directory.

Software Requirements

The 5800 system open edition software requires at minimum the JDK 1.5 software.

Open Edition Software Startup

The 5800 system open edition software can run on Solaris, Linux, or Windows environments. To start the open edition software, go to the `openedition/bin` directory and execute the `start.sh` file for Solaris and Linux environments or the `start.bat` file for the Windows environment. The open edition software listens on port 8080 of the machine you start it on.

See “[Open Edition Software Configuration Settings](#)” on page 47 for directions on changing the port number.

Open Edition Software Shutdown

Connect to port 8080 of the machine running the 5800 system open edition software with your web browser (<http://localhost:8080> if you are on your local system). Click on `HttpContext [/admin]`, then [Click here](#) to shutdown the open edition software.

Schema Modification

To add a custom schema to the 5800 system, create an XML file detailing your custom schema. Refer to the XML files in the `config` directory for examples of a custom schema. Also, see “Configuring Metadata and File System View” in *Sun StorageTek 5800 System Administration Guide*.

Once your XML schema file is complete, stop the open edition software and run the `metadata_merge_config.sh` script (`metadata_merge_config.bat` on Windows) located in the `bin` directory. This script takes one command-line argument, which is the full path to your XML schema file. The open edition software should be stopped while updating the schema.

▼ To Activate a New Schema for the Open Edition Software

- 1 Shut down the open edition software if it is currently running.
See “[Open Edition Software Shutdown](#)” on page 46 for details.
- 2 Run the `metadata_merge_config` program to activate the new schema.

3 Restart the open edition software.

See “[Open Edition Software Startup](#)” on page [46](#) for details.

Open Edition Software Event Log

The open edition software event log is automatically stored under `/openedition/logs/emulator.log`. The event log contains all the transactions that the open edition software has processed, as well as startup and shutdown information. This log can be very helpful in debugging your 5800 system client applications.

Open Edition Software Configuration Settings

You can configure the open edition software through the open edition software configuration file located at `/openedition/config/emulator.config`. [Table 3–1](#) provides the settings you can change.

TABLE 3–1 Open Edition Software Configuration File Settings

Settings	Description
<code>honeycomb.cell.capacity.megs = size</code>	<code>size</code> is the amount of available storage (in Mbytes) for the open edition software. The default is 500 Mbytes. Note that the actual capacity is 80% of the value provided, which enables the healing of a missing disk in the 5800 system (healing is not implemented in the open edition software).
<code>honeycomb.protocol.port = port_number</code>	<code>port_number</code> is the port the open edition software will listen on.

For further information on the configuration file, refer to the *Sun StorageTek 5800 Administrator’s Guide*.

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